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HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
RADIO AND TELEVISION

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Consultants to the Firm
ROBERT L. HAMMETT, P.E.
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JUN 7 1993

FEDERAL COMMUNICATIONS COMMISSION
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June 1, 1993

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FCC - MAIL ROOM

Ms. Donna R. Searcy
Secretary
Mail Stop Code 1170
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Dear Ms. Searcy:

Enclosed is an original and four copies of the Hammett & Edison comments to MM Docket 93-114, *In the Matter of Review of the Commission's Rules Governing the Low Power Television Service*. The comment deadline is June 18, 1993, so these comments are timely filed.

Sincerely,

Dane E. Erickson

tg

Enclosures (5)

cc: Mr. Keith A. Larson, Chief, LPTV Branch (w/encls.)
Mr. Clay C. Pendarvis, Chief, TV Branch (w/encls.)

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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JUN 7 1993

MM Docket No. 93-114

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In the matter of)
)
Review of the Commission's)
Rules Governing the Low Power)
Television Service)
)

To: The Commission

COMMENTS OF HAMMETT & EDISON, INC.

The firm of Hammett & Edison, Inc., Consulting Engineers, respectfully submits its comments in the above-captioned proceeding relating to the processing of Low Power Television (LPTV) and TV Translator applications. Hammett & Edison, Inc. is a professional service organization that has provided consultation to commercial and

A "substantially complete" processing criterion would penalize those applicants who go to the expense of attempting to achieve a "letter perfect" application. In contrast, a "mid-level" processing standard would accommodate serious applicants, without the threat of a "death sentence" dismissal for an inadvertent *minor* error.

Examples of defects that Hammett & Edison believe should still qualify as fatal defects are as follows:

1. Inconsistent geographical coordinates. If the geographical coordinates on the FCC Form 346 do not agree with the site map geographical coordinates, the application should be dismissed. Geographical coordinates are a fundamental parameter, and no ambiguity should be tolerated.
2. Inconsistency in site elevation and center of radiation heights. These are, again, core parameters. If the Form 346 heights, site map elevation height, and antenna elevation drawing heights do not agree, the application should be dismissed. The Commission should not have to guess which heights are "correct" heights when different portions of an application are inconsistent.
3. Antenna make, model, orientation, and beam tilt. If there is an error or inconsistency in the make and model number of the proposed antenna, or an error or inconsistency in the orientation of the main beam or axis of symmetry of the antenna, or an error or inconsistency in the beam tilt to be employed, the application should be dismissed. Sometimes a single letter or digit in the antenna model number can indicate a significantly different pattern. If the model number on a custom directional pattern submitted as an exhibit to the application differs from the model number shown on the Form 346, which entry is to be believed? If reliance on electrical or mechanical beam tilt is made to reduce the antenna gain at the radio horizon, and there is a discrepancy between the Form 346, the engineering statement, and an elevation pattern, again, which is to be believed? These are fundamental, core parameters for which Commission staff, and parties potentially affected by the proposed station, should not have to guess.

4. Channel number and offset. If there is any internal inconsistency in the application as to the channel number requested, whether a specified offset will be employed, or what that offset would be (minus, zero, or plus), then the application should be dismissed without an opportunity to amend. Again, these are fundamental, core parameters for which the Commission staff should not have to guess.

Other than these four core parameters, Hammett & Edison believes that an applicant should be given *one* 30-day opportunity to correct any internal inconsistencies or mutually-exclusive conditions identified by FCC staff before the application is dismissed.

ANTENNA AZIMUTHS

Hammett & Edison has retainer clients for whom we regularly review all TV Translator and LPTV applications that may potentially affect that client. Where a symmetrical LPTV or TV Translator directional antenna pattern is proposed, we have noticed that some applicants specify the left-hand major lobe, some specify the right-hand major lobe, and some even specify the axis of symmetry, as directed in a 1982 FCC public notice (described below). Yet it seems that many such ambiguous applications have been found acceptable for tender by Commission staff.¹

This ambiguity on the applicability of the antenna azimuth specified in Section II, Item 5 of FCC Form 346 is intolerable. The Commission staff, and interested parties reviewing TV Translator and LPTV applications, should not have to guess the directional antenna orientation truly proposed by a TV Translator or LPTV applicant.

The simplest solution is for Commission staff to apply rigorously the azimuth policy specified in the penultimate paragraph of the December 8, 1982, FCC public notice "Commission Calls For Submission of Specific Technical Data from All Low Power Television Applicants Proposing directional Antennas." That paragraph instructed:

The maximum should correspond to zero degrees on the tabulation or, alternatively, in the case of symmetrical antennas, along the line of symmetry. However, the actual antenna orientation as it is proposed to be installed should be specified by stating the direction

¹ A letter identifying this problem and requesting clarification on Commission policy regarding symmetrical antenna patterns was sent to LPTV Branch staff on May 6, 1992. That letter and its four attachments, Figures 1-4, are included in these comments, as Attachment 1. Regrettably, no response to that letter has been received yet.

of the main radiation lobe or the line of symmetry with respect to true North.

The confusion regarding the correct azimuth to show on Section II, Item 5, to Form 346 is not surprising, given the conflict between the azimuth policy specified in the 1982 Notice and the Note 2 instructions to FCC Form 346, which state "for directional antennas in the horizontal plane, show the direction of the main radiation lobe(s)." If a symmetrical directional antenna is specified, the azimuth indicated in Section II, Item 5, of the Form 346 should be rigorously interpreted as applying to the axis of symmetry, as demonstrated in Figure 2 to Attachment 1, even if the proposed community of service falls on one of the symmetrical side lobes. To do otherwise creates uncertainty, requiring telephone calls to the proponent to find out what was really intended.

MINOR CHANGE DEFINITION

Hammett & Edison agrees that the current "major change" definition for TV Translator and LPTV modifications is restrictive, but fears that the solution proposed in the NPRM would become a worse burden to the Commission and to its licensees. The Notice proposes a relaxed definition for "minor change", in which the distance to the station's maximum protected contour would be defined as a circular area centered on the station's present location. Any modification that would keep the proposed modified protected contour within this circular area would then be considered a minor change and could be filed at any time, and no public notice of the filing would be given.

Although the NPRM described this relaxed minor change definition as "appealing" to FCC staff, Hammett & Edison is very concerned that such a relaxed minor change definition would be ripe for abuse. Use of highly directional antennas is the heart and lifeblood of TV Translator/LPTV station design, especially when the stations are located in already well-served areas, rather than in remote areas as the Commission originally envisioned. To allow an existing TV Translator/LPTV station with a highly directional antenna pattern to swing a circle defined by the distance to the protected contour in its main beam, and then to file a supposedly minor-change application for a new site, or even the same site, but with the main beam in an entirely different direction, invites all sorts of mischief. Granted, the proposed minor-change application is still supposed to comply with all of the interference protection criteria defined in the FCC Rules (NPRM, at Paragraph 16). But if Hammett & Edison has learned any lesson in its 40-plus years of

reviewing applications prepared by others, it is that there is virtually no limit to what the Commission will grant in an uncontested application.

Hammett & Edison therefore believes that the Commission would be making a grave error in adopting such a liberal definition of "minor change." The threat is that potentially affected parties would not have the opportunity to receive notice of such supposedly minor changes before they are granted. These affected parties would therefore not be able to act as a "safety valve" to overloaded Commission staff by independently reviewing those applications and pointing out any errors. We have seen, time and time again, erroneous claims that contours would not overlap. These erroneous claims occur because of failure to calculate contours with sufficient resolution, honest error, or, in some cases, intentional misrepresentation. The Commission needs to maintain the "safety valve" checking of applications that is possible only when public notice of filing is given.

Hammett & Edison must therefore regretfully oppose the proposed relaxed definition of a major change, and urges that the Commission retain its present definition: any extension of the existing protected contour would be a major change. Such changes could only be filed during a window, and public notice of the filing would be required. With the reduced processing backlog and the issuance of filing windows at approximately six-month intervals, waiting for the next window opening is not an unreasonable burden. Where conditions beyond the control of a TV Translator or LPTV licensee require it to relocate immediately, these situations can be adequately addressed by issuance of a Special Temporary Authority (STA), granted pursuant to a pre-window FCC Form 346 filing. When the next window opens, that Form 346 can then be included in the universe of submitted applications, with the appropriate public notice of the filing. If the modifications authorized by the STA are found to be grantable, then those modifications become permanent. If not, the STA is canceled and the *secondary service* TV Translator or LPTV station must find some other solution, or go dark. Of course, if interference is reported as a result of the modified facilities authorized by the STA, the Commission can immediately revoke the STA, without having to first hold a time-consuming administrative hearing.

Hammett & Edison notes that even the present "minor-change" definition is not as restrictive as it could be, in that it is based on not extending a station's *protected* contour. A truly rigorous definition would instead additionally require no extension of a

station's *interfering* contour. For TV Translator/LPTV stations, this would be the F(50,10) contour 45 or 28 dB below the station's protected contour, depending on whether the potentially affected station is on the appropriate frequency offset.

Hammett & Edison is additionally very concerned with Footnote 16 to the NPRM, which states "A change in frequency offset designation (plus, minus, zero, or none) involves frequency changes within a broadcast channel and is, therefore, not considered a major change." Hammett & Edison believes this is an incorrect observation that needs clarification, as a change in frequency offset can have a tremendous impact on the LPTV allocations landscape. Going from specified offset to non-specified offset is hardly a "minor change". Co-channel stations not on the appropriate specified offset are required to provide a 45 dB D/U ratio, whereas co-channel stations operating *on an appropriate offset* are only required to provide a 28 dB D/U ratio. Even going from one specified offset to a different specified offset should be considered a "major change." Although upgrading from no offset to a specified offset should be included in the minor change criteria, thus requiring no window and no public notice, changing the offset of a station already on record as having an offset should always be defined as a major change, and should be permitted only during a filing window and with the appropriate public notice.

The declaration in Footnote 16 should not be allowed to stand. To do so would make a mockery of the Commission's allocation rules for co-channel TV, TV Translator, and LPTV stations. A change from specified offset to non-specified offset, or any change in specified offset (plus, minus, or zero), *must* be defined as a "major change."

CUT-OFF OF MINOR CHANGE APPLICATIONS

The NPRM proposes that minor-change applications be considered as "cut-off" on the date filed, but for the Commission to have the option of re-classifying minor-change applications as major in the event they become mutually exclusive with applications received in filing windows (NPRM, at Paragraph 20). So long as the more liberal minor-change definition proposed in the NPRM is not adopted, Hammett & Edison endorses both of these proposed changes to the Commission's processing of TV Translator and LPTV applications.

SPECIFIED OFFSET POLICY

Current Commission policy regarding upgrading of existing LPTV or TV Translator stations not operating on specified offsets, in order to allow grant of a new co-channel LPTV or TV station, is to require first that the license of existing LPTV or TV Translator station(s) be formally modified to reflect the necessary specified offset. Current policy does not allow grant of an application that would avoid prohibited overlap with an existing co-channel station by relying on the anticipated relaxed desired-to-undesired (D/U) ratio of 28 dB available to co-channel stations operating on the appropriate specified offset. This policy applies even where the proposed new LPTV or TV Translator station has obtained a letter from the existing LPTV or TV Translator station indicating the latter's willingness to upgrade to the specified offset (generally with the additional provision that the new station pay the cost of upgrading the frequency tolerance of the existing station to ± 1 kHz).

Hammett & Edison submits that the above described policy is now unreasonably restrictive. While such a policy may have made sense from an administrative efficiency standpoint in the days when the Commission had thousands of pending LPTV applications, that policy now seems no longer useful. Hammett & Edison therefore proposes that the Commission accept applications for new LPTV or TV Translator stations, or modifications to existing LPTV or TV Translator stations, that are contingent on up to three existing co-channel LPTV or TV Translator stations upgrading to specified offsets, if the applicant states it will bear all reasonable and prudent costs of such upgrade(s). "Reasonable and prudent" costs would include the cost of preparing and filing the FCC application(s) modifying the station license(s) to show operation on a specified offset, in addition to the actual hardware and installation costs.

The Commission could then place a restrictive condition on the construction permit of the newcomer station specifying that no equipment or program tests could commence until the affected station(s) had in fact implemented the frequency tolerance upgrades, and minor-change applications for modification of license to reflect these upgrades had been filed.

The advantage of this approach would be that, if an application requiring the upgrade of an existing co-channel LPTV or TV Translator station was ultimately not granted because of, for example, a mutually-exclusive application not requiring upgrade of

that existing co-channel station, then the unsuccessful applicant would not have unnecessarily gone to the expense of upgrading one or more co-channel LPTV or TV Translator stations just in order to have its application considered.

Hammett & Edison also believes that the co-channel LPTV or TV Translator stations requiring upgrade to specified offset, in order for a new LPTV or TV Translator station to be granted or for an existing LPTV to be modified, should not have the right of refusal. So long as the proponent station is willing to pay all reasonable and prudent costs of upgrading to a specified offset, an existing LPTV or TV Translator station should be required to do so.

TYPE ACCEPTANCE LOOPHOLE FOR TV TRANSLATORS PROPOSING OPERATION USING A SPECIFIED OFFSET

Hammett & Edison has encountered a "loophole" in the Commission's type acceptance rules that needs to be closed.² This loophole applies when a TV Translator station proposes offset operation. TV Translators differ from LPTV stations in that their input signal is generally at RF, from another TV Translator station or from a TV station. TV Translator stations therefore generally use a heterodyne signal processor, where the incoming TV channel is frequency converted down to an intermediate frequency (IF), amplified, and then frequency converted to the pertinent output channel. The frequency tolerance of the transmitted signal is therefore subject not only to the frequency tolerance of the local oscillator of the TV Translator, but is also subject to the frequency tolerance of the incoming signal.

Existing TV Translators that are type accepted or notified for a ± 1 kHz frequency tolerance actually only promise to maintain the frequency of the translator's local oscillator within ± 1 kHz; the frequency tolerance of the input signal must then be added to this tolerance. Even where the input signal is directly from a TV station, and not an intermediate TV Translator station, the best frequency tolerance of the output signal that can be guaranteed without specialized feedback circuitry is ± 2 kHz. The reduced D/U ratio of 28 dBu allowed by the FCC Rules for co-channel stations operating on the appropriate offsets is only valid if the two signals are, in fact, maintained within ± 1 kHz of

² A letter identifying this problem and requesting clarification of Commission policy regarding TV Translators proposing ± 1 kHz frequency tolerance was mailed to Chief, LPTV Branch on October 19, 1990. A follow-up letter was mailed on December 30, 1991. Copies of those letters are attached, as Attachment 2 to these comments. Regrettably, no response to either letter has been received yet.

their respective offsets (-10 kHz, 0 kHz, or +10 kHz). Therefore, the grant of a TV Translator station supposedly using a translator that is merely type accepted or notified for ± 1 kHz frequency tolerance could cause mutual interference. In such a case the real frequency tolerance is at least ± 2 kHz, and at worst is ± 161 kHz.³

A possible solution to this loophole is to add a note to the list of type accepted or notified TV Translators, to cover the case where a specialized feedback circuit is added to the local oscillator of a TV Translator. This specialized circuitry can compensate for the frequency variations of the incoming signal, so that the output signal is always within ± 1 kHz of its specified offset, even if the frequency of the incoming signal varies by up to ± 500 kHz. ITS Corporation and Television Technology Corporation both offer such a specialized circuit, at a cost of approximately \$4,000. Other TV Translator manufacturers undoubtedly offer similar devices.

In order for licensees of existing TV, TV Translator, and LPTV stations to determine whether they need to file a Petition to Deny against a new or modified TV Translator station that is only grantable on the basis of specified offset, an additional footnote to the list of type accepted or notified translators that indicates the special (and significantly more expensive) local oscillator feedback circuit necessary⁴ for TV Translators proposing ± 1 kHz frequency tolerance, would eliminate this ambiguity. Applications not proposing use of a TV Translator with a model number specifying a true ± 1 kHz frequency tolerance, even when the input signal frequency is subject to variation, would then be subject to dismissal, presumably following its one 30-day opportunity to amend the application.

DEFINE HOW TO CALCULATE ANGLE TO RADIO HORIZON

FCC Form 346 has a footnote explaining that the gain to be specified for the proposed transmitting antenna is the gain at the radio horizon. But nowhere do the LPTV Rules define how the depression angle to the radio horizon is to be calculated. We propose that the formula in Section 73.684(c)(1) of the TV Rules be specified. This

³ Applying in the case of a 100-watt or less Channel 69 TV Translator, with a frequency tolerance of $\pm 0.02\%$, per Section 74.761(a) of the FCC Rules; that is, $(801.25 \text{ MHz})(\pm 0.02\%) = \pm 160.25 \text{ kHz}$.

⁴ While an alternative solution would be to demodulate the incoming signal to baseband, and then re-modulate that video signal onto an RF carrier, this approach would cost about the same as the "smart oscillator" option, and would have the disadvantage of introducing additional degradation to the translated signal.

formula gives the depression angle to the radio horizon by taking the square root of the height above average terrain (HAAT) and multiplying by 0.0277.

A related issue is whether the gain at the radio horizon is to be based on the 8-radial HAAT, or based on the HAAT in each specific direction. For simplicity, we propose that it be normally acceptable to base the depression angle to the radio horizon on the 8-radial average HAAT, and that this angle be assumed constant at all azimuths. However, in the case of dispute of whether a prohibited contour overlap exists, or in the case of a combination of mechanical and electrical tilts, then the controlling contour will be that determined using the actual mechanical and electrical beam tilt at each azimuth, and based on the angle to the radio horizon at that azimuth. Further, we propose that the default azimuthal resolution be 5° increments, in order to ensure that "clipping" problems do not go undetected.

A second related issue is how to treat LPTV or TV Translator stations with negative effective heights. Although a negative HAAT is rare for a full-service TV station, it is not all that unusual for LPTV or TV Translator stations. There are two logical choices: one option would be to base the angle to the radio horizon on an assumed minimum HAAT of 30.5 meters, as is done when projecting field strength contours using the F(50,50) curves. This would result in the radio horizon at 0.15° below horizontal. The other option would be to define the radio horizon as being at zero degrees for negative HAATs. We favor the zero degree option, because it would avoid a discontinuity in the angle to the radio horizon as the HAAT decreases below 30.5 meters; that is, a plot of angle to the radio horizon versus HAAT would be a smooth function, ending at 0° for HAATs less than or equal to zero.

We also propose that, where the main beam gain of the proposed antenna is other than the main beam gain specified in the manufacturer's catalog, that a required exhibit be an elevation pattern for the proposed antenna. This will ensure that Commission staff, and other interested parties reviewing the application, can readily determine that a

Edison therefore proposes that distances be calculated in accordance with Section 73.611(d) of the FCC Rules, and that azimuths be calculated on the basis of spherical trigonometry.⁵

TERRAIN OBSTRUCTION SHOWINGS

At Paragraph 12, the NPRM proposes that terrain obstruction waivers be extended to include mutually exclusive applications submitted during the same filing window as the instant application. Hammett & Edison enthusiastically endorses this proposal. Although we realize that a mutually-exclusive conflict with a simultaneously filed application will generally only come to light after initial processing by FCC staff, we believe that the advantages of allowing resolution of mutually exclusive applications, where a terrain obstruction showing can demonstrate no mutual exclusivity, outweigh the burdens on Commission staff that lottery designation would entail. Hammett & Edison envisions that in most cases there would be jointly filed engineering exhibits, thus avoiding Commission staff time in evaluating possibly conflicting terrain obstruction exhibits.

In this regard, it would be helpful if the Commission would give official notice to the Terrain Integrated Rough Earth Model (TIREM) developed by the Electromagnetic Compatibility Analysis Center (ECAC) at Annapolis, Maryland, and available from the National Telecommunications Information Agency (NTIA). TIREM is a significant improvement over the FCC-recognized National Bureau of Standards (NBS) Technical Note 101, in that Technical Note 101 is basically a "cookbook" of various terrain obstruction models (knife-edge diffraction, diffraction over a rounded object, tropospheric propagation, etc.). An engineer must manually evaluate the intervening terrain profile and select which of the several Technical Note 101 models is most appropriate. In contrast, TIREM automatically selects the most appropriate model by accessing a 30-second or

⁵ Hammett & Edison notes that the major axis radius of the earth, which has never been specified by the Commission, is irrelevant for spherical trigonometry azimuthal calculations. We further note that in the Hammett & Edison Docket 86-144 comments filed June 9, 1986, it was proposed that the distance calculation algorithms now separately specified in the FM and TV rules (Section 73.208 for FM stations, Section 73.611 for TV stations) be combined to the "Rules Applicable to All Broadcast Stations" portion of Part 73 of the FCC Rules, and further that any Part 74 stations requiring distance calculations be made subject to such a consolidated rule section. Such an approach would eliminate the arbitrary difference in rounding practices between FM and TV stations, where FM distances are rounded to the nearest kilometer, but TV distances are rounded to the nearest one-tenth kilometer. However, these issues were overlooked in the December 29, 1986, Docket 86-144 Report and Order, and remain unresolved.

3-second topography database, deriving the terrain profile for the pertinent path, and selecting the appropriate model. TIREM thus allows computer-derived "actual propagation" maps based on terrain profiles to thousands and even tens of thousands of points on an unbiased grid, and avoids the potential for mischief by the selection of an inappropriate model from Technical Note 101.

Use of TIREM-based propagation studies has been accepted by TV Branch staff,⁶ but, to our knowledge, there has been no definitive case where LPTV Branch staff has accepted a TIREM-based waiver request. This rule making would therefore be an appropriate forum for the LPTV Branch to establish the acceptability of, and indeed its preference for, terrain obstruction waivers based on the far more sophisticated TIREM program, as opposed to subject-to-bias Technical Note 101 showings.

However, in the case of uncontested waiver requests, Hammett & Edison recommends that, as a cost-cutting measure, the Commission continue to accept simple terrain profile showings, with an accompanying statement by the applicant that it believes that the terrain profiles demonstrate sufficient terrain obstruction to ensure that no prohibited contour overlap would occur. This option is proposed simply because it is still less expensive to prepare computer-derived terrain profiles than to conduct TIREM studies or even Technical Note 101 studies. In the case of uncontested waiver requests, it should be sufficient to submit an exhibit demonstrating a family of terrain profiles accompanied by an engineering statement that the applicant believes that no interference will exist.

LPTV CALL SIGNS

Hammett & Edison would welcome the assigning of four-letter call signs to LPTV stations, if such call signs were always followed by the identifier "-LP," and if all LPTV stations were required to so amend their call letters. This would resolve the current confusion between TV Translator and LPTV stations, while not being likely to mislead the lay public into thinking that a secondary-service LPTV station is a full-service TV Broadcast station.

⁶ In 1989, TIREM-based terrain obstruction studies were accepted by TV Branch as the basis for granting a waiver of the July 16, 1987, "ATV freeze", and the acceptance of an application by Community Television

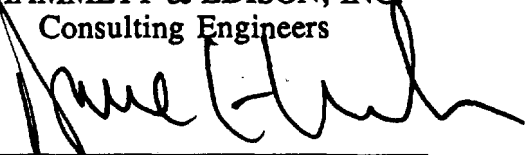
LIST OF FIGURES AND EXHIBITS

The following figures or exhibits have been prepared as a part of these MM Docket 93-114 comments:

1. Attachment 1: May 6, 1992, letter discussing ambiguity of azimuth for symmetrical antenna patterns.
2. Attachment 2: October 19, 1990, and December 30, 1991, letters discussing true 1 kHz frequency tolerance for TV Translators.

HAMMETT & EDISON, INC.
Consulting Engineers

By



Dane E. Ericksen, P.E.
Senior Engineer

June 1, 1993



HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
RADIO AND TELEVISION

Attachement I

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JUN 7 1993

ROBERT L. HAMMETT, P.E.
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JONATHAN C. STILWELL

May 6, 1992

BY FACSIMILE 202-653-5402 @ 5:18 p.m. FCC - MAIL ROOM

Mr. Robert Singleton
Low Power Television Branch
Mass Media Bureau
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

RLH	WFH	DE	GJS	NH
EE	HK	GES	SS	JCS
RSJ	MAW	EM	KL	
JT	MK	JM	LR	
File				

Dear Bob:

Thank you for the time you took to discuss the uncertainty that has come to light regarding LPTV applications. To make the issues involved as clear as possible, I have prepared the attached four polar diagrams that show the ambiguities involved.

As I explained, we were checking to see if an application for a new LPTV station at Heppner, Oregon, on Channel 44, gave the required protection to full service TV Station . The LPTV application (Columbia River Television, Inc., File No. 920211AW) proposed to serve the communities of Heppner and Wasco, Oregon, using a Bogner "F" pattern antenna. This antenna has two symmetrical main lobes, at $\pm 60^\circ$ from the axis of symmetry. The normalized Bogner F pattern is shown on the attached Figure 1.

The ambiguity arises in that the Columbia River Television application only shows a single azimuth of 235°T at item 5 ("Transmitting Antenna") on FCC Form 346. Does this mean that the axis of symmetry would be at 235°T , as per the penultimate paragraph of the December 8, 1982 FCC Public Notice, which states "...the maximum should correspond to zero degrees on the tabulation, or, alternatively, in the case of symmetrical antennas, along the line of symmetry," as shown in Figure 2, or does this mean that one of the two main lobes is at 235°T , as per Note 2 to Form 346, which states "...show the direction of the main radiation lobe(s) in degrees with respect to true north..."? If the single indicated azimuth is to be taken as the orientation of one of the main lobes, which main lobe does it refer to? The attached Figures 3 and 4 show the two possibilities.

We therefore request clarification regarding the apparent discrepancy between the Commission's 1982 public notice indicating that, for symmetrical antennas, the orientation of the axis of symmetry should be indicated, versus the Form 346 Note 2 instructions, which indicates that if the proposed antenna has more than one main lobe, the azimuths of each main lobe should be provided.

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Mr. Robert Singleton, page 2
May 6, 1992

In the case of the Columbia River Television application, if one assumes that the 235°T refers to the right-hand main lobe, as shown in Figure 4, then no prohibited overlap of the protected contour is created by the new LPTV application. If, however, the 235°T refers to either the axis of symmetry (Figure 2) or to the left-hand main lobe (Figure 3), an impermissible contour overlap of the protected contour would result. Therefore, the different interpretations of what the applicant meant by 235°T is a crucial issue for our client because there exists a possibility for prohibited overlap.

We hope you can appreciate our need for an answer. An ambiguous application causes headaches for both the FCC and consultants such as ourselves who need to verify that a new application provides the required protections to existing stations and other pending applications.

Thank you again for your assistance. We look forward to receiving your response as soon as possible.

Sincerely,

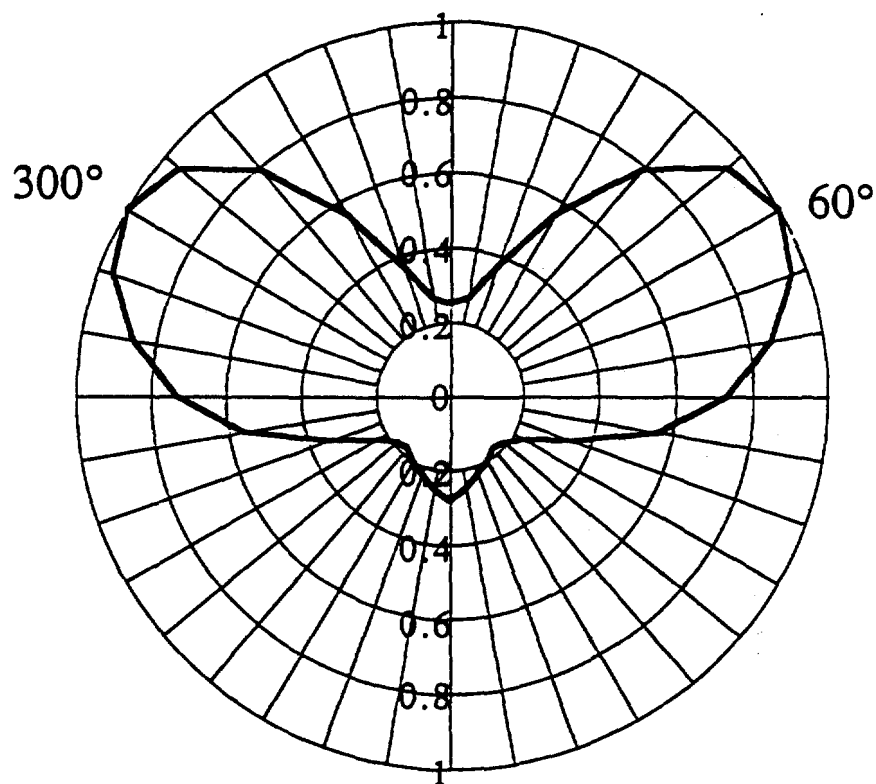
Dane E. Ericksen

mk

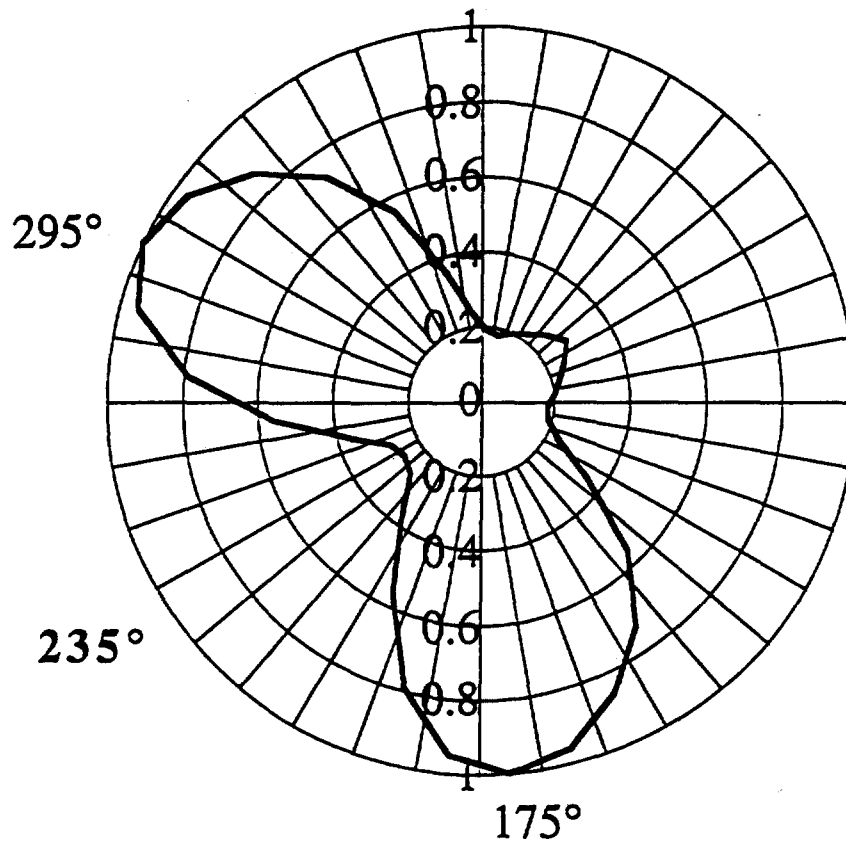
Enclosures (4)

bcc:

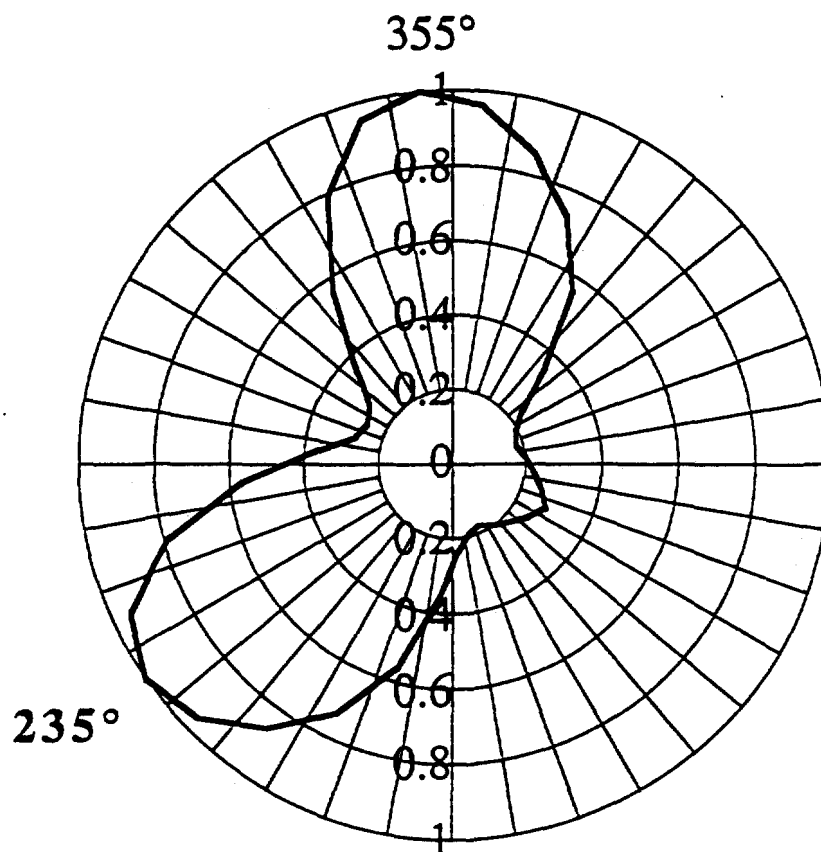
Bogner "F" Pattern Normalized to 0°T



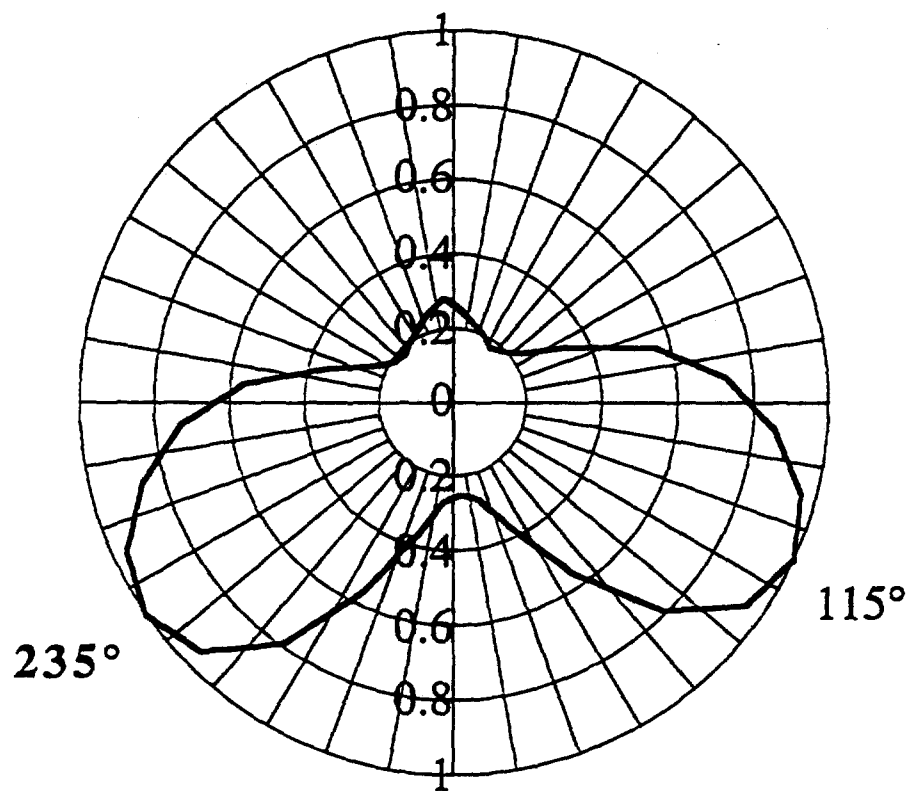
**Bogner "F" Pattern
with symmetry at 235°T**



**Bogner "F" Pattern
with symmetry at 295°T**



**Bogner "F" Pattern
with symmetry at 175°T**





HAMMETT & EDISON, INC.
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NATHAN HAMILTON
STANLEY SALEK
JONATHAN C. STILWELL

Attachement II

December 30, 1991

Mr. Keith Larson
Chief, Low Power Television Branch
Mass Media Bureau
Federal Communications Commission
1919 M Street N.W.
Washington, D.C. 20554

RECEIVED

JUN 7 1993

FCC - MAIL ROOM

Dear Mr. Larson:

In October of 1990, I wrote you regarding the problem of TV translator stations that rely on the reduced co-channel protection ratio permitted for offset operation (i.e., a ± 1 kHz frequency tolerance). Offset operation is not difficult for LPTV stations or for satellite-fed or microwave-fed TV translators, where the input is at baseband video and the only frequency determining component is the crystal oscillator in the modulator stage. However, when conventional translator operation is proposed, that is, where the input is itself a modulated RF signal with its own frequency tolerance, generation of an output signal that is always within ± 1 kHz of the assigned output channel is not a simple undertaking. My October 19, 1990, letter, a copy of which is attached for convenience, asked for guidance on what sort of showing must be made to demonstrate a true ± 1 kHz frequency tolerance when the input signal is at RF, and how parties potentially impacted by an application claiming to be grantable on the basis of a specified offset can verify that the proposed equipment is of a type capable of maintaining a ± 1 kHz tolerance on the output channel even when the frequency of the input channel is varying by a far greater amount.

We are continuing to see cases where offset operation is proposed for a TV translator, yet it cannot be reliably determined from the application that the specialized equipment available from manufacturers of TV translators (by special order, and at considerable extra cost) to ensure a ± 1 kHz tolerance in the output channel, has been proposed. We need to be able to tell our clients whether they need to object to such applications.

I would therefore appreciate a reply to my October 19, 1990, letter at your earliest convenience. Or, if there will be additional delay, please give me a call to let me know how soon we may expect guidance from you on this matter.

Sincerely,

Dane E. Erickson

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Enclosure copy of 10/19/90 letter

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October 19, 1990

Mr. Keith Larson
Chief, Low Power Television Branch
Mass Media Bureau
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Dear Mr. Larson:

This is a follow up to my telephone call of October 17, regarding type acceptance requirements for television translators that propose specified offsets. As you know, Low Power Television Stations or television translators that request offset operation must maintain their output frequency within ± 1 kHz of the specified offset. For LPTV stations or microwave-fed translators this does not present a problem, as the inputs to the LPTV station or translator are baseband video and audio. The stability of the output frequency is therefore solely a function of the stability of the local oscillator in the Part 74 transmitting device.

LPTV/translator manufacturers have recognized the desirability of a low power transmitter which meets a ± 1 kHz frequency stability, as opposed to the $\pm 0.02\%$ frequency stability which is sufficient for non-offset operation, and have accordingly often obtained two levels of type acceptance for their low power transmitters: one specifying a $\pm 0.02\%$ frequency tolerance, and a second type acceptance (with a different or modified model number) showing a tighter ± 1 kHz frequency tolerance. This type acceptance data can then be relied upon by both your staff and private parties examining a translator application, to see if transmitting equipment consistent with the requested mode of operation has been specified.

However, a new situation has arisen: applications are now being submitted that specify conventional translator operation and offset operation. For true translator operation, the output frequency is a function of not only the frequency stability of the local oscillator inside the translator used to create the frequency translation, but also of the frequency stability of the input signal. It appears that it has been a common practice by transmitter manufacturers submitting Part 74 translator type acceptance applications to specify the frequency stability of the local oscillator used to create the frequency translation, rather than the frequency stability of the actual translator output. As long as specified offset was not proposed, and the much more lenient $\pm 0.02\%$ frequency tolerance applied, this alternative measurement had little impact. However, it seems clear to us that it is the output frequency, and not the frequency of an internal local oscillator, which Section 74.761(d) requires be maintained within ± 1 kHz when offset operation is proposed.

Mr. Keith Larson, page 2
October 19, 1990

It has come to our attention that at least two translator manufacturers, ITS Corporation and Television Technology Corporation, offer translators with a "smart" local oscillator. This smart local oscillator detects frequency errors in the input channel and applies an appropriate correction to the translator's local oscillator, so that the translator output is truly stable within the required ± 1 kHz. Without this option, the output frequency of the translator would be no more stable than ± 2 kHz; that is, the basic ± 1 kHz stability of the translator's local oscillator, plus a second ± 1 kHz uncertainty allowed full-service, Part 73 television transmitters. If the input signal is obtained from another translator, as opposed to a television station, even greater frequency departures could exist, even though the translator would still show a type accepted frequency stability of ± 1 kHz. Failure to maintain accurate 10 kHz offsets between co-channel stations would result in interference if those stations were mistakenly granted on the basis of a 28 dB desired-to-undesired signal ratio, as opposed to a 45 dB desired-to-undesired signal ratio for stations operating without offsets.

Now to my questions: must a translator application that proposes conventional translator operation and a specified offset also propose transmitting equipment that is, in fact, capable of meeting a ± 1 kHz frequency stability *in its output channel*? If separate type acceptance for translators with the above described "smart" local oscillator is not to be required, how will LPTV Branch staff and others examining a translator application know whether equipment consistent with offset operation is being proposed? Finally, do you have any plans to issue a public notice, cautioning translator manufacturers that, if ± 1 kHz frequency stability is claimed, type acceptance measurements and applications that they submit to OET must specify the frequency stability of the of the actual translator output, and not merely the frequency stability of an internal local oscillator?

An answer to these questions at your earliest convenience would be greatly appreciated. Thanks very much.

Sincerely,

Dane E. Ericksen

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cc: Mr. Julius Knapp, Deputy Chief, Authorization & Evaluation Division, OET
Mr. Franklin Coperich, OET
Dr. Thomas P. Stanley, Chief Engineer, OET
Mr. Jeff Lynn, ITS Corporation
Dr. Byron St. Clair, TTC